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Solution of the stability problem for a thin shell under impulsive loading

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Abstract

© 2014, Pleiades Publishing, Ltd. The stability problem for a thin shell under an axial impulsive load is considered. A new approach to building a mathematical model is presented, which is based on the Ostrogradskii-Hamilton principle of stationary action. It is shown that the problem reduces to a system of nonlinear differential equations that can be solved numerically and by using an approximate calculation algorithm developed by the authors. A formula determining the dependence between the load intensity and the initial conditions of the problem is derived. In the above setting, the stability problem for a circular cylindrical shell is solved. To determine the critical value of the load impulse, the Lyapunov theory of dynamic stability is used.

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Keywords

impulse, shell, stability